Case Study

BiOWiSH® Crop Liquid

ADM Demonstration Trials Summary

Executive Summary

In the United States, ADM engaged sixteen corn growers to conduct on-farm demonstration trials to assess the yield effects of BiOWiSH® Crop Liquid coated onto urea and urea blends as an Enhanced Efficiency Fertilizer (EEF).

The sixteen demonstration trials each compared two treatments:

- Control, Standard Fertility Program
- Control + BiOWiSH® Crop Liquid

The study determined that the addition of BiOWiSH® Crop Liquid optimized yield potential by improved nutrient uptake in corn by 6.0% (11 bu/acre, 0.72 MT/ha) on average across the sixteen on-farm demonstration trials.

Background

About BiOWiSH Technologies
Headquartered in Cincinnati, Ohio, BiOWiSH Technologies, Inc. is a global provider of biotechnology solutions. As a leader in the agricultural market, we help farmers increase crop production sustainably, safely, and cost effectively. Our revolutionary BiOWiSH® Crop Liquid is a blend of proprietary microbial cultures that can be coated onto dry fertilizer or mixed with liquid fertilizers to create an enhanced efficiency fertilizer. BiOWiSH® endophytic *Bacillus* deliver soil nutrients to crops through the rhizophagy cycle creating a symbiotic relationship between the plant and soil microbes. This helps farmers achieve consistent results across a broad range of operating conditions, climates, and environments. By unifying nature and science, BiOWiSH reinvents the way food is grown. For more information, visit biowishtech.com.

BiOWiSH® Crop Liquid

- Optimizes yield potential by improved nutrient uptake
- Increases nutrient use efficiency and supports nutrient uptake
- Optimizes soil conditions for greater root mass
- Improves soil conditions for increased plant vigor
- Enhances beneficial microbes in the rhizosphere

Available Size

- 264 gal/1000 L

About ADM
ADM is a global leader in human and animal nutrition and the world's premier agricultural origination and processing company. ADM also offers a full range of fertilizer products and micronutrients for farm use. Because of the ADM reputation as a valued farm partner and advisor, BiOWiSH engaged ADM Farm Direct Fertilizer Representatives to facilitate this set of on-farm demonstration trials with Midwestern corn growers.

Objectives

The primary objective of the demonstration trials was to evaluate the performance of BiOWiSH® Crop Liquid coated onto urea and urea blends as an Enhanced Efficiency Fertilizer for corn, compared to the Control portions of the demonstration trials. The secondary objective was to compare these real-world, on-farm demonstration trials to BiOWiSH's large database of independent third-party small plot trials.

Implementation Program

ADM facilitated sixteen on-farm demonstration trials where BiOWiSH® Crop Liquid coated urea was applied at the manufacturer's recommended rate collectively on 4,585 acres (1,855 ha) pre-planting. The on-farm trials were located across Missouri, Illinois, Indiana, and Kentucky (USA). Trial application rates on each farm spanned between 232 lbs/acre (260 kg/ha) and 475 lbs/acre (532 kg/ha) of urea (46-0-0) or urea blends (34-0-0-12S).

Corn was planted at each farm in accordance with the farmer's practice, along with pest and disease management through the growing season. While some on-farm demonstration trials had supplemental irrigation via center pivots, the majority did not have supplemental irrigation.

Table 1. Fertilizer, Treatments, and Application Timing

Treatment	Application Rate Range lbs/acre [kg/ha]	Application Phase
Control	232 - 475 [260 - 532]	Pre-Plant
Control + BiOWiSH® Crop Liquid	232 - 475 [260 - 532]	Pre-Plant

**BiOWiSH® Crop Liquid used at manufacturer's recommended rate.*

Results

Yield and economic parameters averaged across the sixteen on-farm demonstration trials are presented below. The Control + BiOWiSH® Crop Liquid treatment optimized yield potential by improved nutrient uptake by an average of 6.0%. Net Income and Profit Change were averaged based on crop and input cost values at each farm.

Table 2: Yield and Net Income Table

Treatment	Yield bu/acre [MT/ha]	Yield Increase bu/acre [MT/ha]	Yield Increase (%)	Net Income USD/acre [USD/ha]	Profit Change USD/acre [USD/ha]
Control	180 [11.29]	-	-	850 [2100]	-
Control + BiOWiSH® Crop Liquid	191 [12.01]	11 [0.72]	6.0	908 [2244]	58 [144]

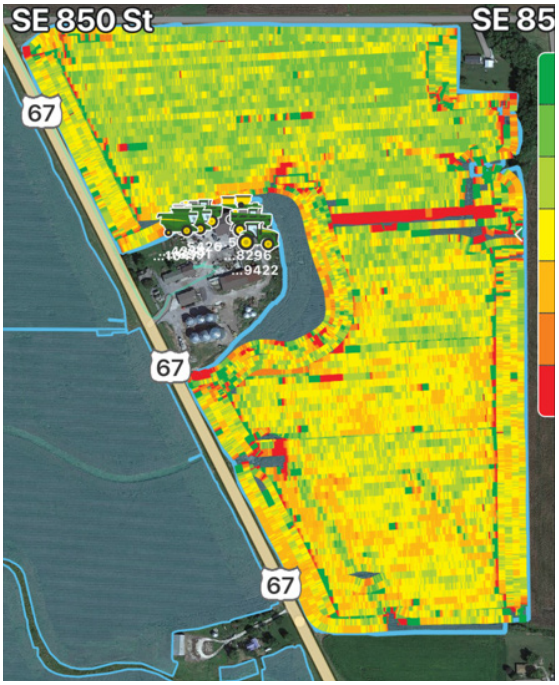
**Calculations for conversions between imperial and metric units are based on the original source data; slight rounding differences may occur within reported publication values.*

***Net income is the crop value minus the fertility program cost. It does not account for non-fertility expenses.*

****Profit change is the difference between net income of the respective program and the Control.*

Testimonials: See What Growers are Saying

"We tested ten different products on corn in 2022. BiOWiSH® is the only one that created a stronger yield response. BiOWiSH® treated urea had an 18 bu per acre advantage over non-treated urea. It did not affect the spread of the fertilizer or create any clumps or clogging. We experienced over $100/acre net return!" — Scott Turman of Scott & Amy Turman Farms.



This image, supplied by Scott Turman, is a yield map demonstrating the results of his on-farm BiOWiSH® trial. The map colors are scaled relative to the amount of grain harvested, with green indicating highest yielding areas and red indicating lowest yielding areas, as classified by the combine yield monitor. This field is split north and south by an alleyway denoted by the red horizontal line. The area to the north of the red line received an application of urea coated with BiOWiSH® Crop Liquid. The area to the south of the red line was the Control (no BiOWiSH®).

Control + BiOWiSH® (top) and Control (bottom), Yield map image provided by Scott Turman, Scott & Amy Turman Farms

Conclusion

BiOWiSH® endophytic *Bacillus* deliver soil nutrients to crops through the rhizophagy cycle creating a symbiotic relationship between the plant and soil microbes. This leads to optimized yield potential by improved nutrient uptake. BiOWiSH® Crop Liquid, when added to a standard corn fertility program, optimized yield potential by 6.0% (11 bu/acre, 0.72 MT/ha) on average across the sixteen on-farm demonstration trials. This on-farm performance of BiOWiSH® Crop Liquid is comparable to other corn research studies conducted by independent third parties in corn (See BiOWiSH® corn research studies). Based on average crop and input cost values, this resulted in an average profit increase of $58 USD/acre ($144 USD/ha) for the farmers taking part in this demonstration program.

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